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## REMARKS

Claims 1-30 remain pending.

In the Final Office Action, the Examiner rejected<sup>1</sup> claims 1-30 under 35 U.S.C. § 102(b) as being anticipated by Liu et al. ("New Fast Algorithms for the Estimation of Block Motion Vectors," IEEE Int'l Symp. on Circuits & Systems, pp. 148-157, April 1993).

### Claims 1-9 and 16-26:

Applicant respectfully traverses the § 102(b) rejection of claims 1-9 and 16-26 over Liu et al. Independent claims 1, 16, 19, and 25 require a method, encoder, medium, and system including, *inter alia*, "determining a set of K candidate blocks  $B_1..B_K$ , with each block  $B_i$ , for  $i=1$  to K, identified by a pixel in search set  $S_i$  and minimizing a first distortion function relative to the target block; and determining which [one] of the K candidate blocks  $B_1..B_K$  minimizes a second distortion function relative to the target block." Liu et al. fails to disclose all elements of the claimed method, encoder, medium, and system set forth in claims 1, 16, 19, and 25.

Page 3 of the Office Action alleges that the claimed first distortion function is met by "MAD" (e.g., equation 1 on page 148 of Liu et al.) and somewhat cryptically refers to a "sub-block" with regard to the claimed second distortion function. Liu et al., however, fails to disclose at least minimizing a second distortion function as set forth in the claims.

#### 1. Examiner's response:

Page 2 of the Final Office Action alleges that "the features upon which applicant relies (i.e., minimizing a second distortion function) are not recited in the rejected claim(s)."

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<sup>1</sup> The only stated rejection was of claims 1-9 and 16-26 in the Office Action dated April 25, 2005. Claims 10-15 and 27-30, which were withdrawn in that Office Action, have never been properly rejected.

Further, the statement on page 2 of the Final Office Action that claims 1-9 and 16-26 will be "treated as representative claims" is legally incorrect. While the Board of Patent Appeals and Interferences may properly group claims (M.P.E.P. § 1205.02), an Examiner may not. See M.P.E.P. § 707.07(d): "A plurality of claims should never be grouped together in a common rejection, unless that rejection is equally applicable to all claims in the group."

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2. Applicant's reply:

Each of independent claims 1, 16, 19, and 25 requires, *inter alia*, "determining which [one] of the K candidate blocks  $B_1..B_K$  minimizes a second distortion function relative to the target block." By its plain language, this limitation requires both the presence of a second distortion function and the determination of which candidate block minimizes it relative to the target block. The determined candidate block, then, is the one that "minimizes a second distortion function."

Contrary to the Final Office Action, the relied-upon features (i.e., minimizing a second distortion function and determining which block so minimizes that function) are present in claims 1, 16, 19, and 25, and the above-quoted obfuscation does nothing to show where in Liu et al. these features may be found.

Again, Liu et al. only discloses minimization of a single distortion function in equation 2 on page 148. Liu et al. does not disclose, either expressly or inherently, either the existence of a second distortion function, or determining which block minimizes such a second distortion function, as required by claims 1, 16, 19, and 25. That Liu et al. discloses sub-block motion-filed estimation on pages 152 and 153 does not cure this lack of a second distortion function. Nor does Liu et al. disclose "determining which [one] of the K candidate blocks  $B_1..B_K$  minimizes a second distortion function" for the K candidate blocks for which "minimizing a first distortion function relative to the target block" was performed.

3. Examiner's response:

Page 3 of the Final Office Action alleges that "Sections III and IV of Liu et al disclose the concept of such sub-block division of the candidate blocks to estimate the motion vectors that reduces the computation when the MAD between the sub-blocks is minimized as in Equation (2)."

4. Applicant's reply:

Section III of Liu et al. concerns subsampling of motion fields by only using, for example, every other block in a frame. Note that the "subsampling" refers to a field or frame, and not to a block. Section III does not concern "sub-block division" as alleged in the Final Office Action.

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Applicant specifically traverses the characterization of the blocks in Liu et al. as "candidate blocks." The techniques as described in sections II, III, and IV are discrete and non-cumulative (see page 154, at the bottom of the first column, "So far in this paper, we have introduced three techniques . . . In this section [V], we combine the pixel decimation technique . . . presented in Section II, with the subsampled and the sub-block motion field-estimation techniques of Sections III and IV). Hence, it is factually incorrect to imply that the sub-block technique of Section IV somehow operates on "candidate blocks" produced in another section.

Even Section V of Liu et al., which does disclose combination of the various techniques, and which was not cited in the Final Office Action, fails to teach or suggest "determining a set of K candidate blocks  $B_1..B_K$ , with each block  $B_i$ , for  $i=1$  to K, identified by a pixel in search set  $S_i$  and minimizing a first distortion function relative to the target block; and determining which [one] of the K candidate blocks  $B_1..B_K$  minimizes a second distortion function relative to the target block" as claimed.

If the Examiner disagrees, he is respectfully to specifically point out in Liu et al. the precise teaching of each and every one of the above-quoted limitations, including the claimed: set of K candidate blocks, the first determining step, the first distortion function, the second determining step, and the second distortion function. To date, this crucial evidence from Liu et al. has not been provided, and a *prima facie* case of anticipation simply has not been established.

Because Liu et al. fails to disclose all elements of claims 1, 16, 19, and 25, the § 102(b) rejection over Liu et al. is improper and should be withdrawn. Dependent claims 2-9, 17, 18, 20-24, and 26 are allowable at least due to their dependence from claims 1, 16, 19, and 25.

**Claims 10-15 and 27-30:**

Applicant respectfully traverses the § 102(b) rejection of claims 10-15 and 27-30 over Liu et al. Independent claim 10 requires a method including, *inter alia*, "determining a first distortion measure based at least on pixels of the target block and the first minimum block that are outside the first row or column of the target block and the first minimum block; determining a second distortion measure based at least on pixels of the target block and the second minimum block that are outside the second row or column of the target block." Independent claim 27 requires an encoder including, *inter alia*, "a first minimization module that determines a set of K

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candidate blocks  $B_1..B_K$ , with each block  $B_i$ , for  $i=1$  to  $K$ , minimizing a respective first distortion function relative to the target block, the respective distortion function based only on a set of two or more collinear pixels from the  $i$ -th row or column of the target block and a set of two or more collinear pixels from the  $i$ -th row or column of block  $B_i$ ; and a second minimization module that determines which of the  $K$  candidate blocks  $B_1..B_K$  minimizes a second distortion function based at least on pixels outside the  $i$ -th row or column of the target block.” Independent claim 29 requires a method including, *inter alia*, “identifying a set of two or more candidate blocks in the reference frame, with each candidate block minimizing a first distortion function based on only one respective line of pixels of the target block and a corresponding line of pixels in the candidate block, the one respective line being different for each candidate block; and determining which one or more of the candidate blocks minimizes a second distortion function based on pixels from more than two lines of the target block.” Liu et al. fails to disclose all elements of the claimed methods and encoder set forth in claims 10, 27, and 29.

As noted above in Footnote 1, none of claims 10-15 and 27-30 has been properly rejected, so Applicant need not respond where, as here, a *prima facie* case of anticipation has not been established.

Nonetheless, in an effort to be responsive, Applicant notes that Liu et al. fails to disclose at least “determining a second distortion measure based at least on pixels of the target block and the second minimum block that are outside the second row or column of the target block,” as set forth in claim 10, and “determining which one or more of the candidate blocks minimizes a second distortion function based on pixels from more than two lines of the target block,” as set forth in claim 29. Liu et al. also fails to disclose at least “a second minimization module that determines which of the  $K$  candidate blocks  $B_1..B_K$  minimizes a second distortion function based at least on pixels outside the  $i$ -th row or column of the target block,” as set forth in claim 27. Rather, Liu et al. only appears to disclose a single function that could, purely for the sake of argument, be called a distortion function.

Because Liu et al. fails to disclose all elements of claims 10, 27, and 29, the § 102(b) rejection over Liu et al. is improper and should be withdrawn. Dependent claims 11-15, 28, and 30 are allowable at least due to their dependence from claims 10, 27, and 29.

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Reconsideration and allowance of claims 1-30 are respectfully requested.

In the event that any outstanding matters remain in this application, Applicant requests that the Examiner contact Alan Pedersen-Giles, attorney for Applicant, at the number below to discuss such matters.

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 50-0221 and please credit any excess fees to such deposit account.

Respectfully submitted,

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